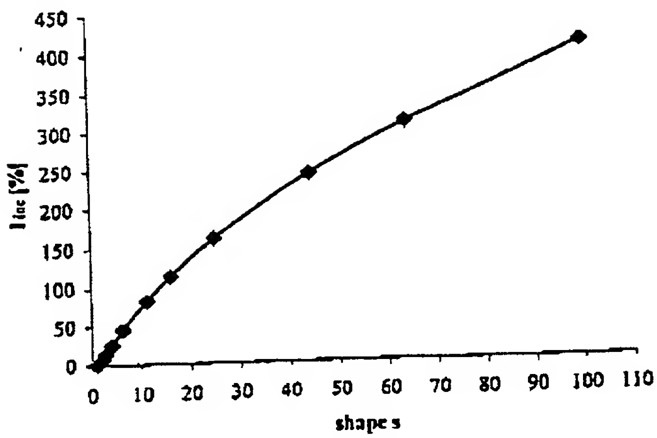



**Fig.1** The increase in circumference is dependent on the relation between width vs. depth of a channel (s = width/depth). The cross section is constant. For example: A channel, which is 10 times wider than deep has an increase of more than 50% capillary force in comparison to a square one.

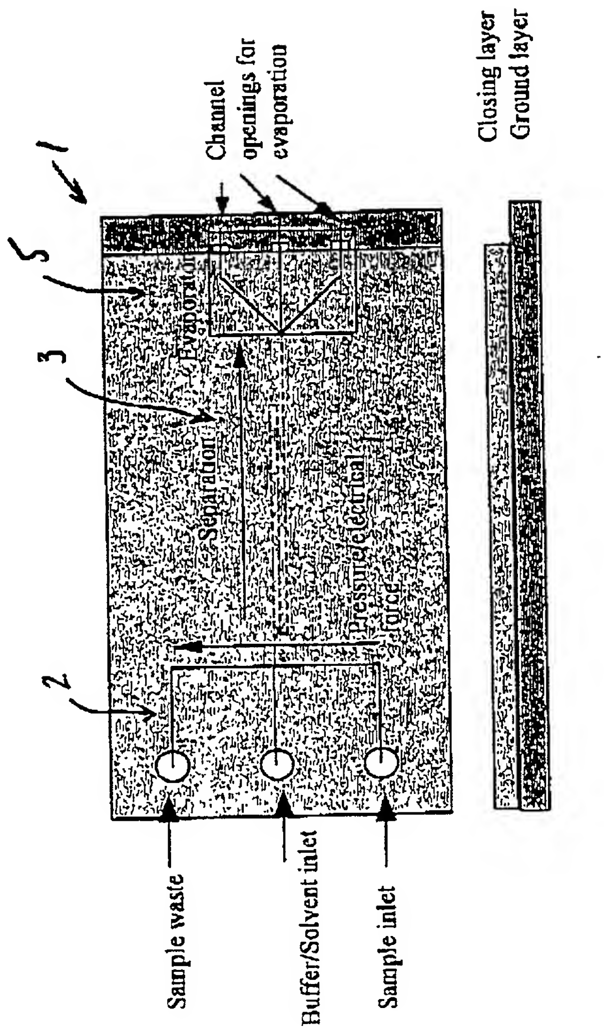

Sample waste
Buffer/Solvent inlet
Sample inlet
2
3
5
1
Separation
Evaporation
Pressure (electrical) force
Channel openings for evaporation
Closing layer
Ground layer

Fig. 2

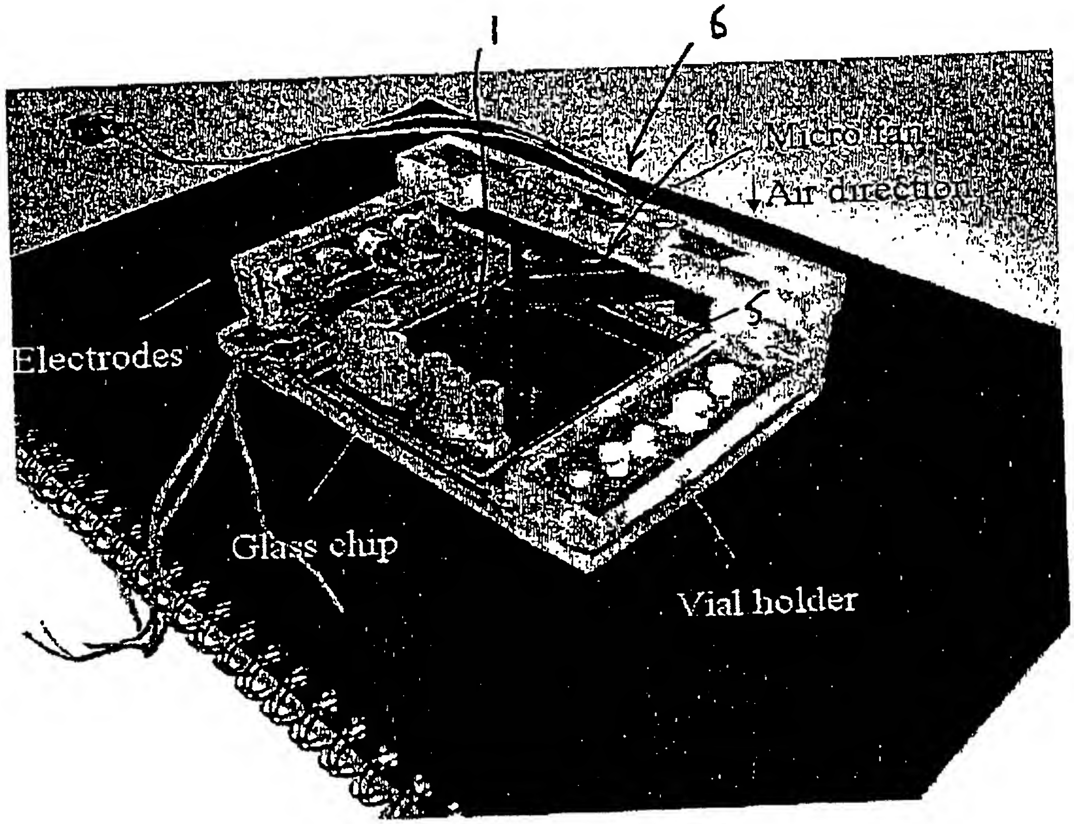



Fig. 3 Chip holder for 3in x 3in glass chips compatible with standard microscope stages; includes a micro fan for constant "fresh" air, vial holders and electrodes for sample injection

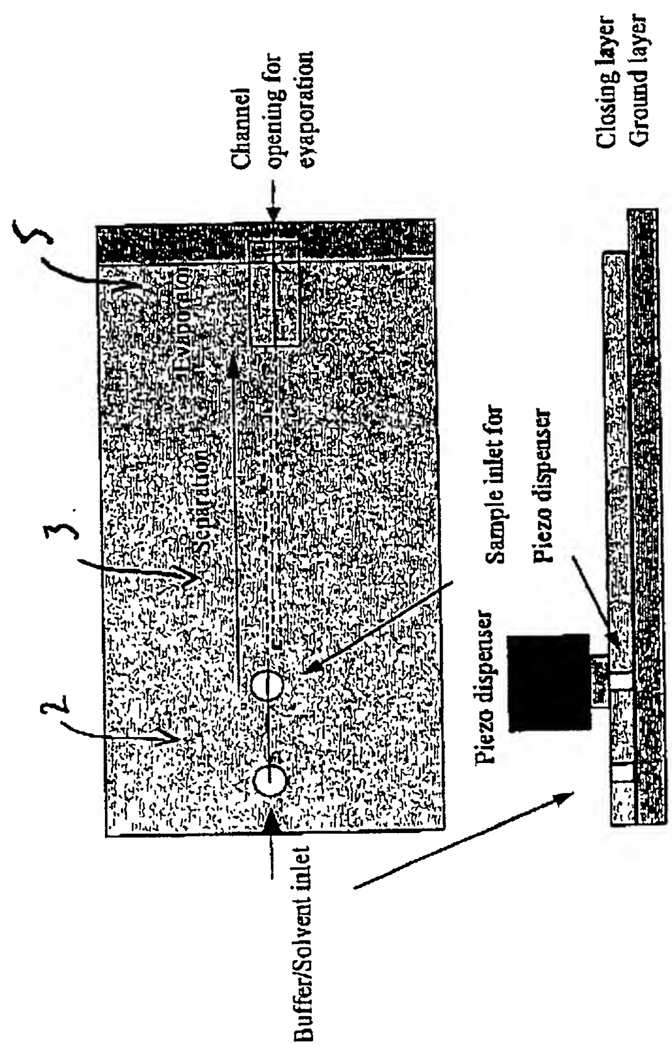
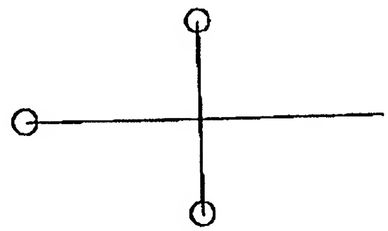

Channel opening for evaporation
Closing layer
Ground layer
5
Evaporation
3.
Separation
2
Sample inlet for Piezo dispenser
Piezo dispenser
Buffer/Solvent inlet

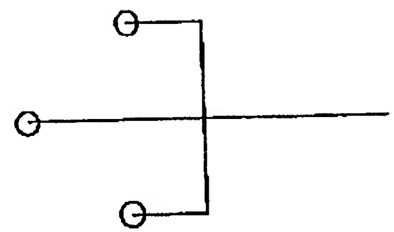
Fig. 4

# Inlets



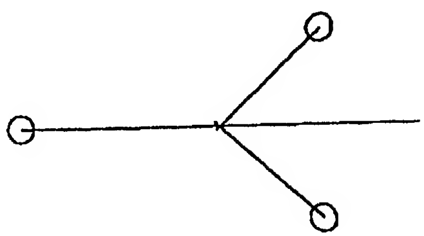
T-Inlet classic

Fig 5(a)



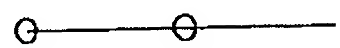
T-Inlet, modified

Fig. 5(b)



T-Inlet, anti-stream

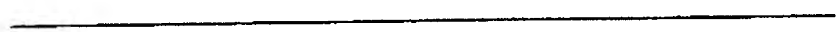
Fig. 5(c)



Inject-Inlet

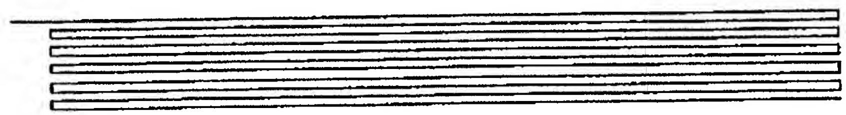
Fig. 5(d)

# Separation Channel



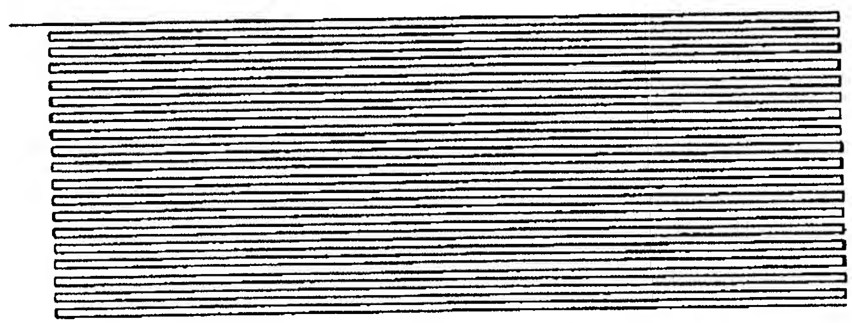
Single channel straight

Fig. 6(a)



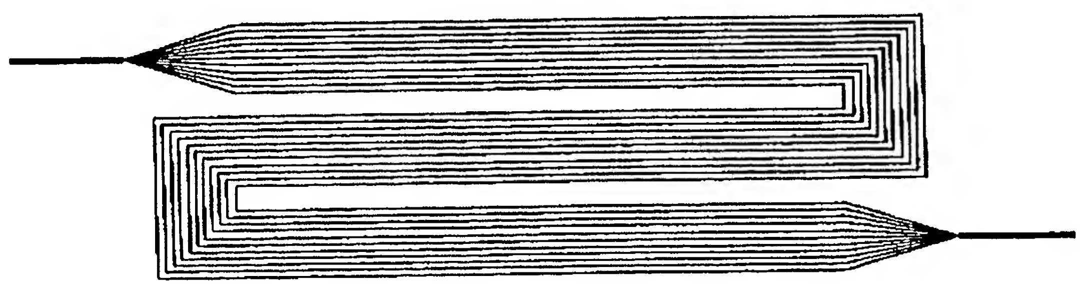
Single channel meander

Fig. 6(b).



Single channel meander extra long

Fig. 6(c).



Channel bundle parallel, meander

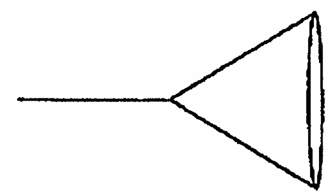
Fig. 6(d)

Evaporators



Single channel

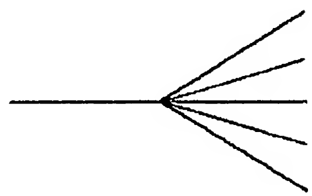
Fig. 7(a)



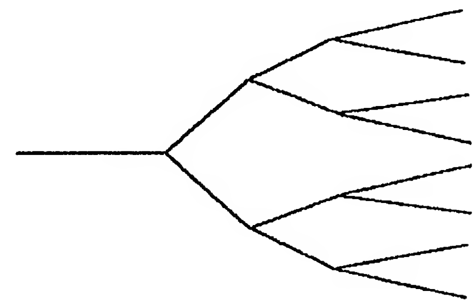
Funnel-shape

Fig 7(b)

# Multi Channel Evaporators



Umbel-Shape Fig. 8(a)



Root-Shape Fig. 8(b)

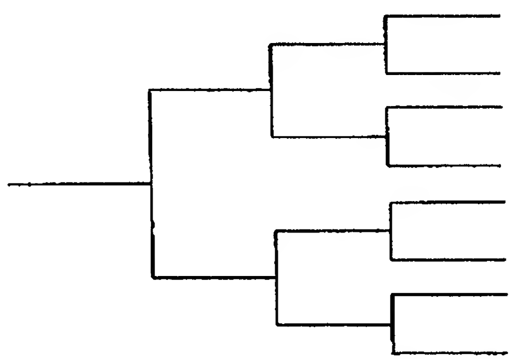


Fig 8(c)

1:1 Splitter, rectangular 3-fold

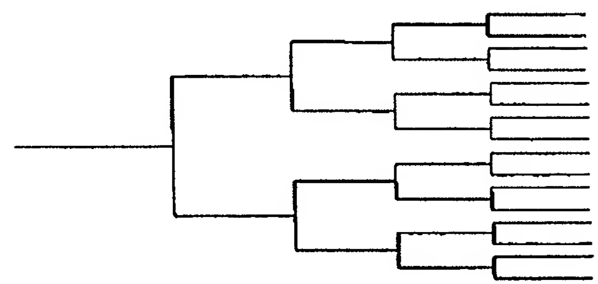
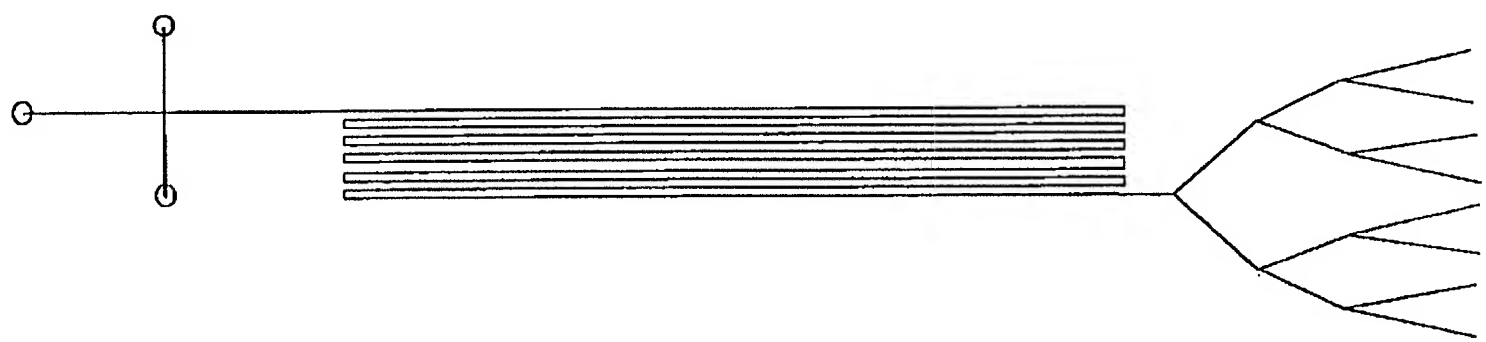


Fig. 8(d)

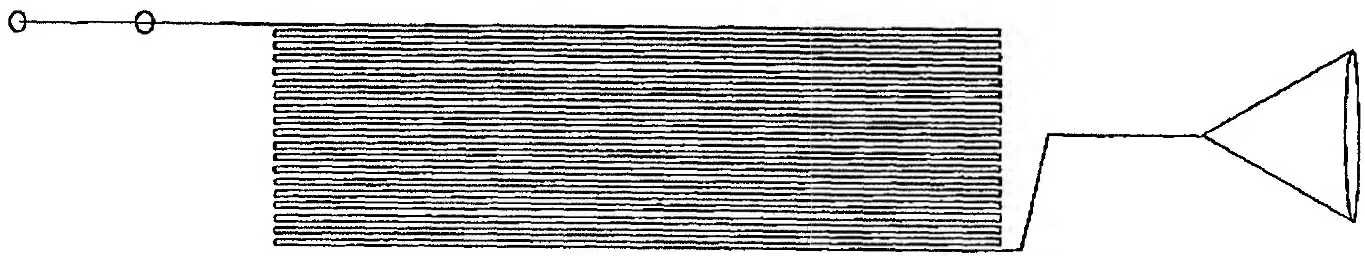
1:1 splitter, rectangular 4-fold

Fig 9



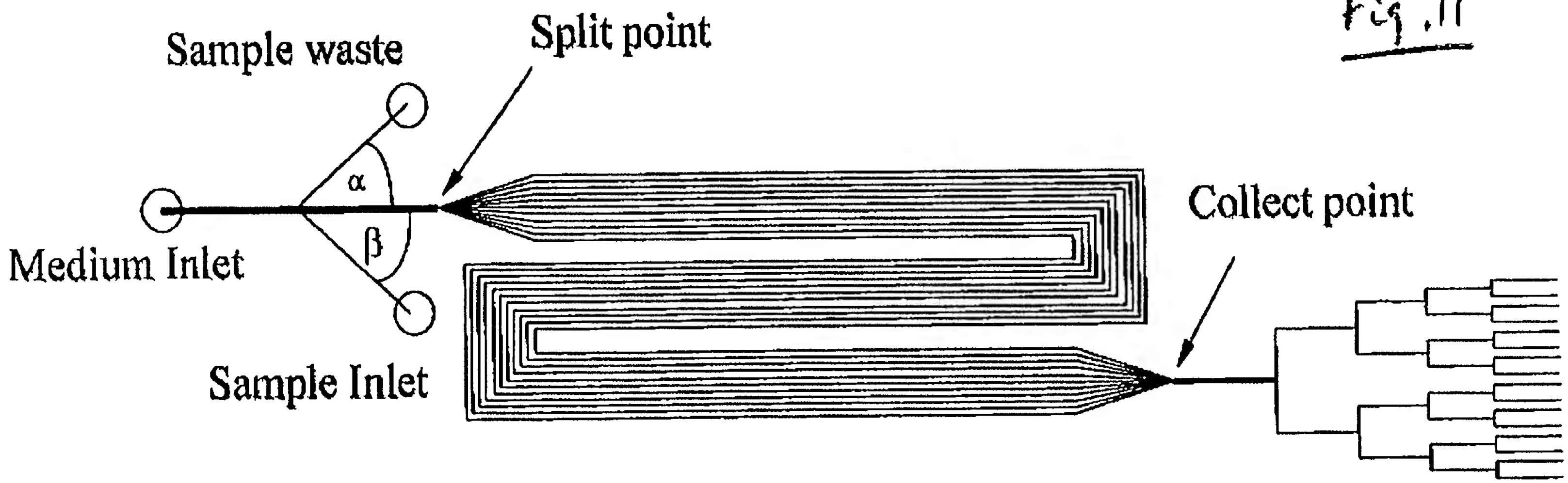
Chip design with classic T-inlet and medium length meander single channel Separator including multi channel root-shape evaporator; all channel dimensions a the same (10µm wide and 0.5µm deep)

Fig. 10

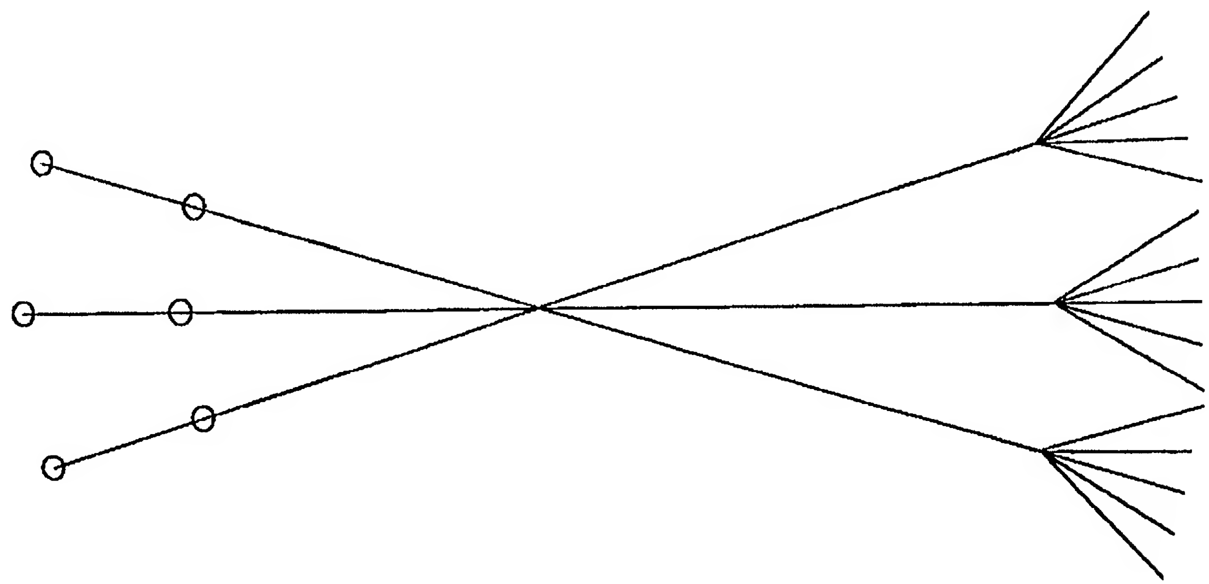


Chip design with inject-inlet including extra long single meander channel for separation; funnel-evaporator

Fig. 11

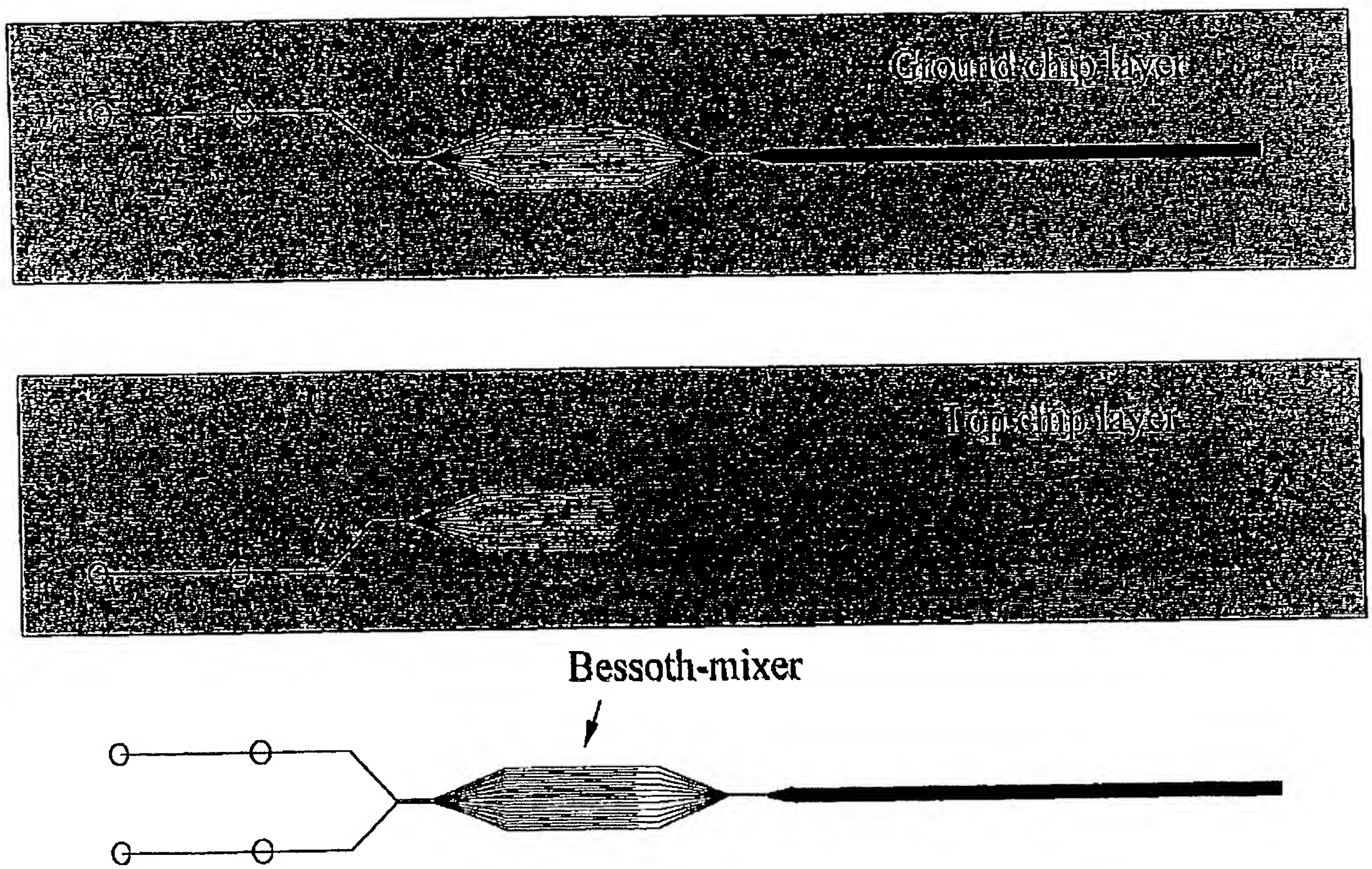



Chip design including an anti-stream inlet with different angles (α, β) for sample inlet and sample waste, channel dimensions vary between the different regions; bundle of 11 separation channels meandering parallel; evaporator 4-fold 1:1 splitter



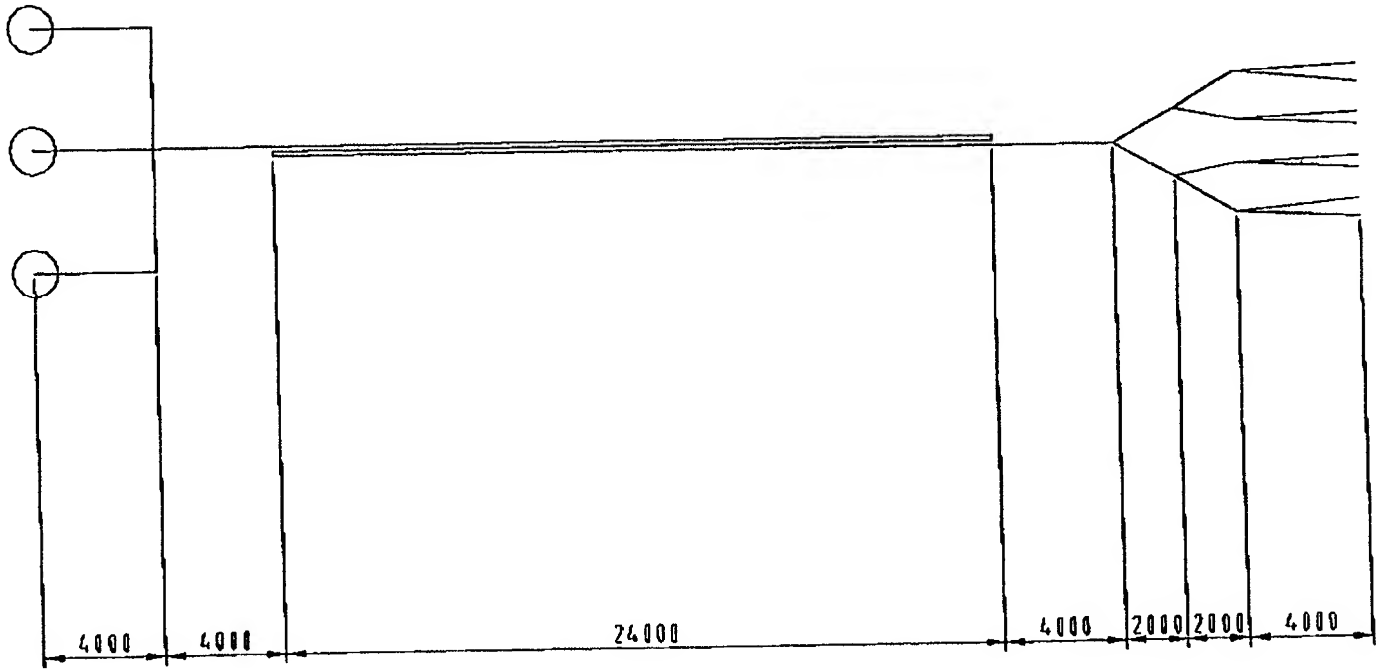
Chip design for a three compound synthesis including three umbel-shape evaporators and three inject-inlets

Fig. 12




Chip design for Immuno-assays including two inject-inlets on two diffent layers and following "Bessoth-mixer"(Lit); single wide channel evaporator

Fig. 13




design pop02, created 04-04-2000 @ Nils Goedecke

Channel width 110μm after etching, depth 25 μm over the whole structure

Fig. 14(a)

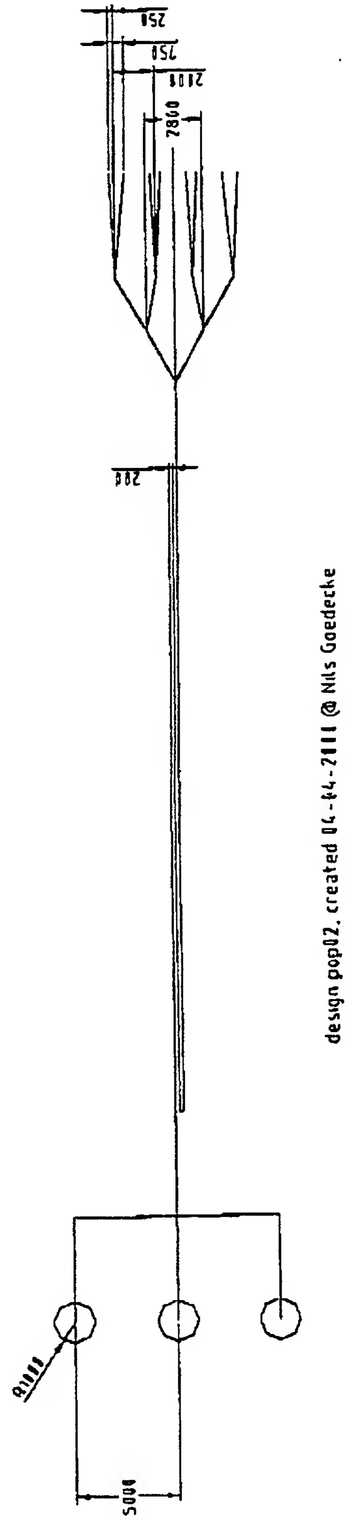

250
750
2100
2800
200
5000
design pop02, created 04-04-2001 @ Nils Goedecke

Fig. 14(b)

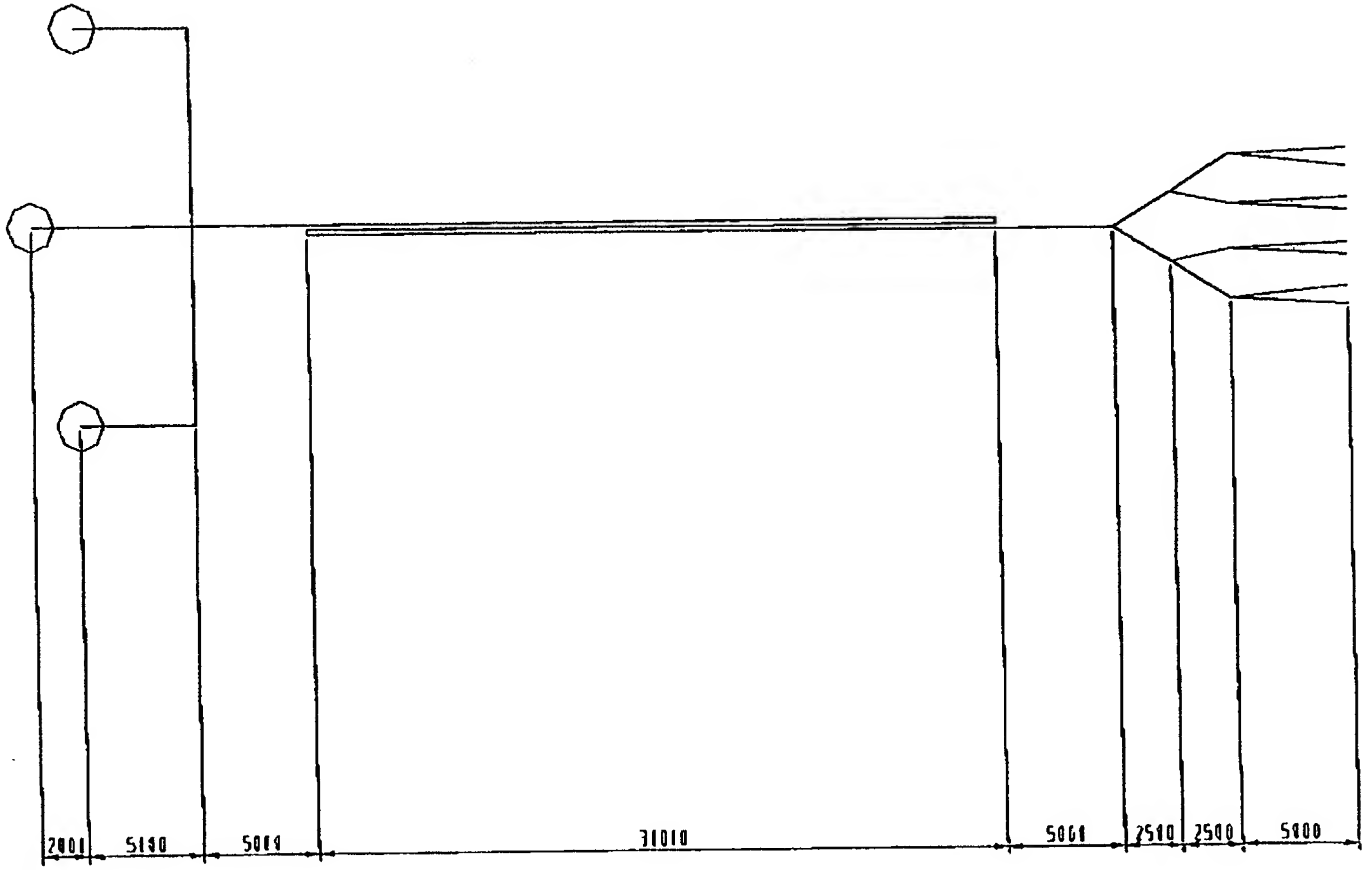
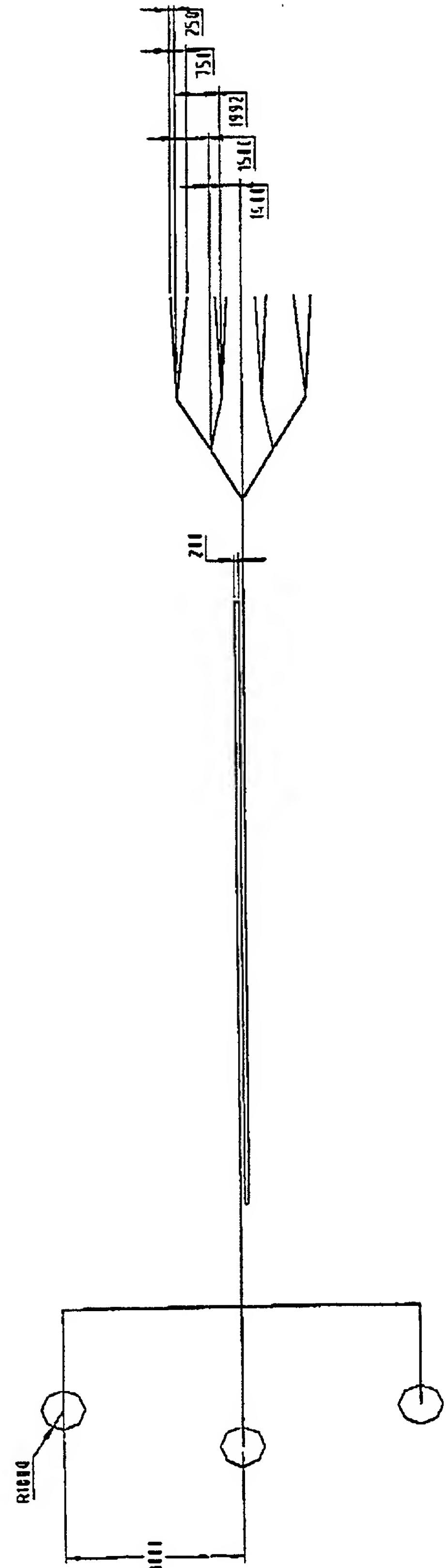



Fig 15(a)

channel width 40 microns for each design

design pop03a by Nils Goedecke 23 June 2000 IC Department of Chemistry

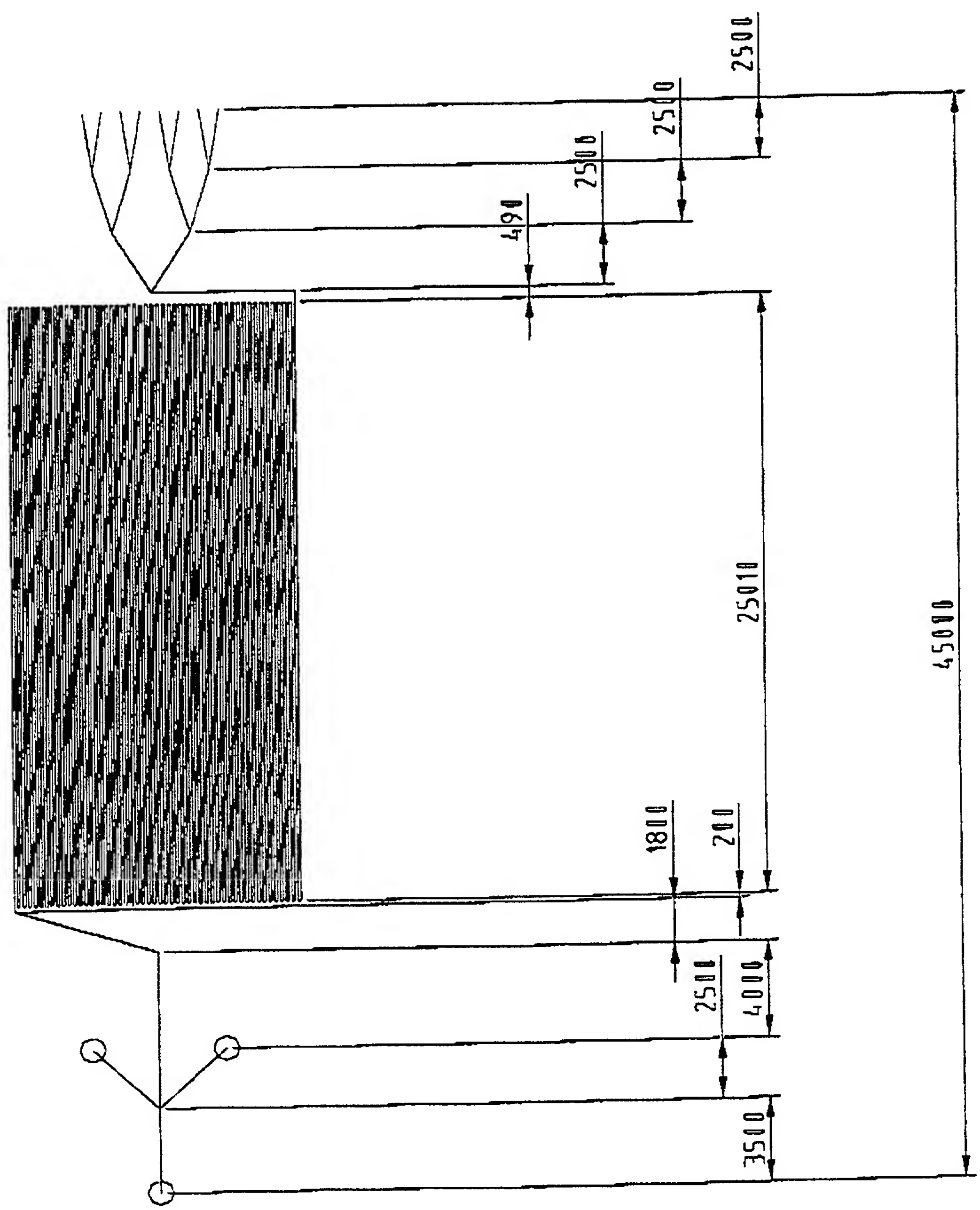
Channel width after etching 60μm; depth 10 μm




channel width 40 microns for each design

design pop03a by Nils Goedecke 23 June 2000 IC Department of Chemistry

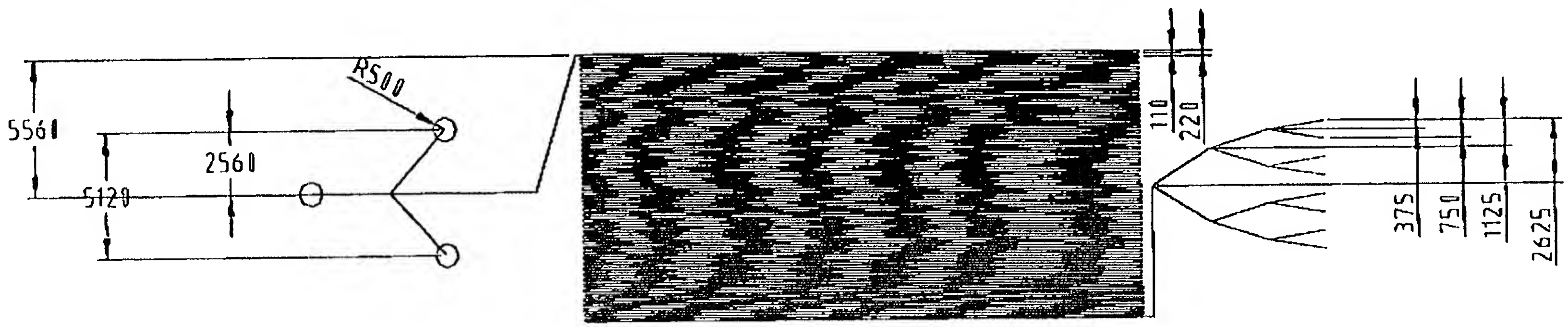
Fig. 15(b)




Design lkm 01. Sl 5, Sep Ch W 10, EVvap Ch W 10 by Nils Goedecke 05.07.2000

Fig. 16(a)

10045554.041502




This layout includes the anti-stream-inlet and a 2.5m separation channel. Theoretically, a channel of this length 10μm wide and 0.1μm deep if running with a $\eta \sim 40$ has an efficiency of more than 500000 theoretical plates in 10 min run time.

Design lim 01. S.I 5, Sep Ch W. 10, EVvap Ch W.10 by Nils Goedecke 05 07 2000

Fig. 16 (b)

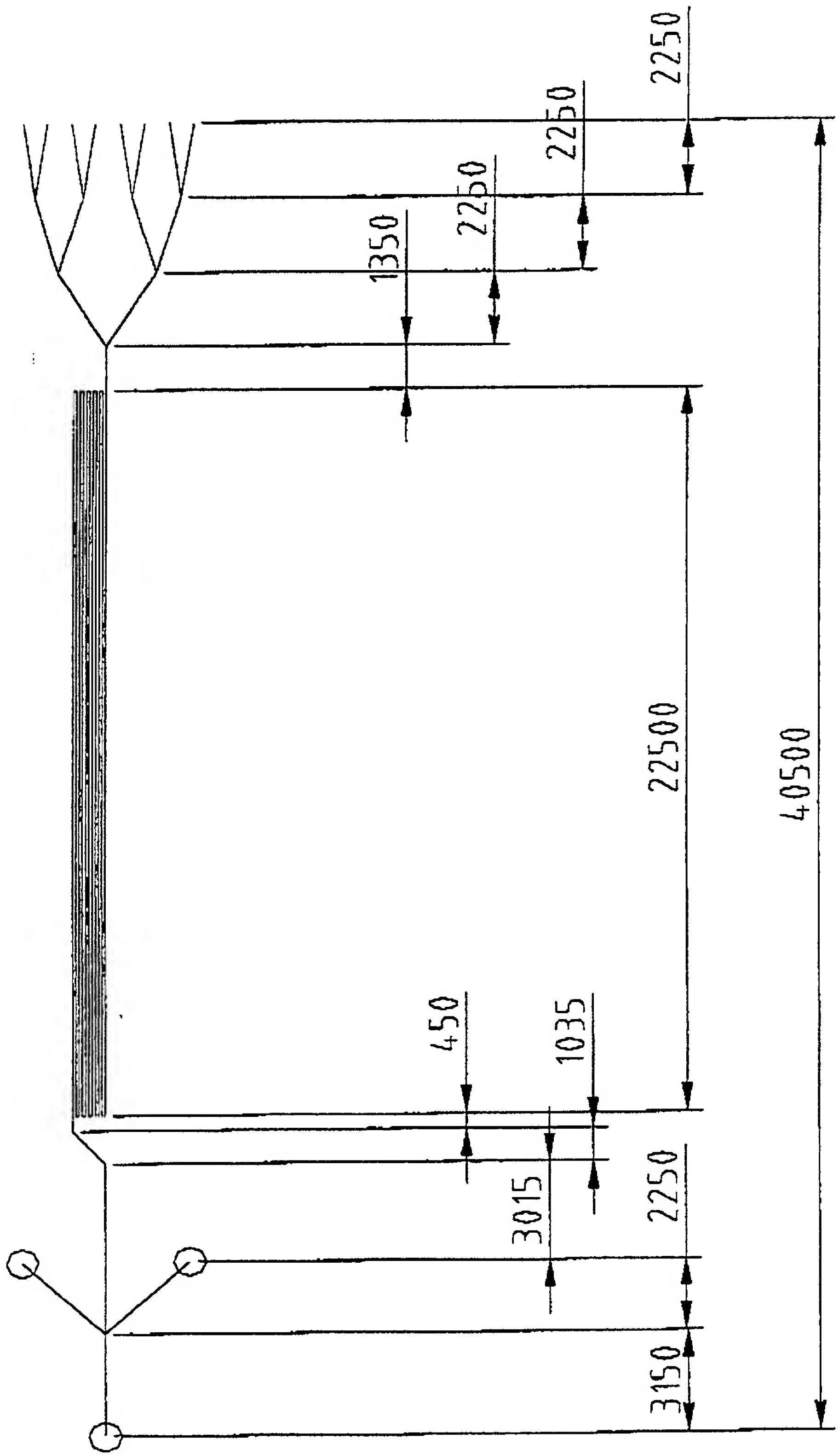
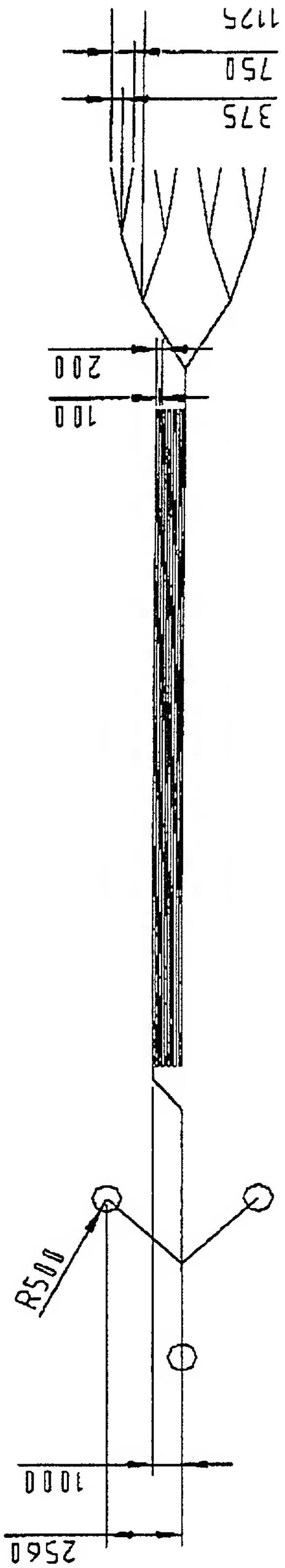



Fig. 17(a)

Design lim 02 Sl.5 Sep Ch.W. 10 EVvap Ch.W.10 by Nils Goedecke 09 11 2000




Design Im 02 S1 5 Sep Ch W 10 EVvap.Ch.W 10 by Nils Gaedecke 09 11.2000

Fig. 17(b).

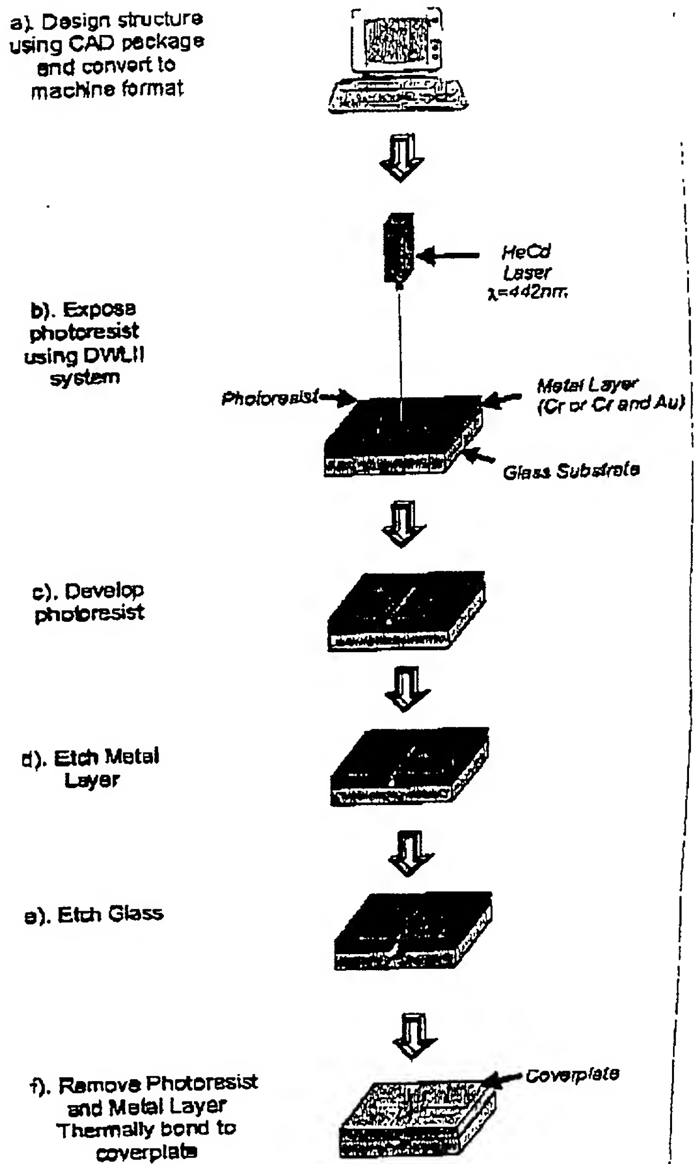
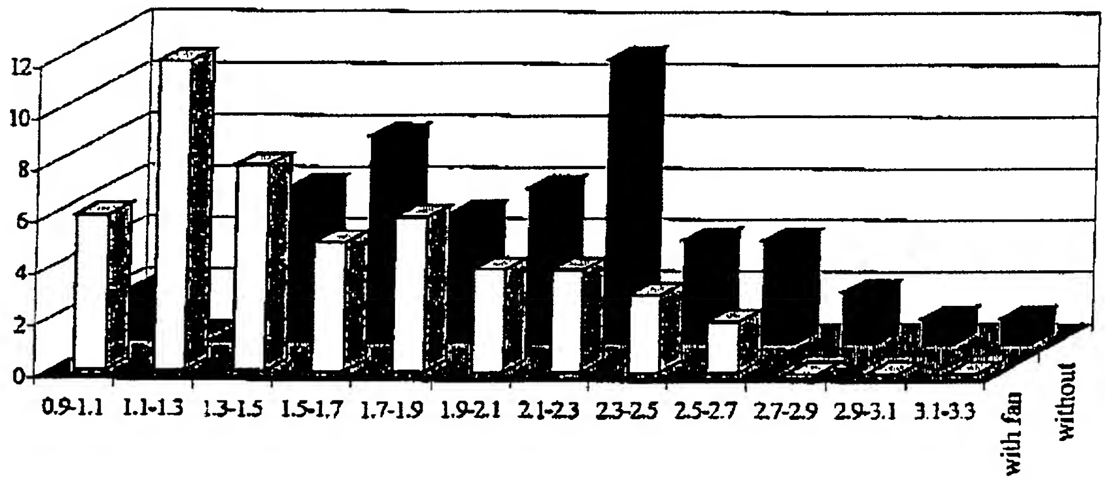

a). Design structure using CAD package and convert to machine format
HeCd Laser λ=442nm
b). Expose photoresist using DWLII system
Photoresist
Metal Layer (Cr or Cr and Au)
Glass Substrate
c). Develop photoresist
d). Etch Metal Layer
e). Etch Glass
f). Remove Photoresist and Metal Layer Thermally bond to coverplate
Coverplate

Fig. 18




-Velocity differences within the channel (60x20μm) for 10μm latex beads in a pop02 chip driven through evaporation with and without "air condition"; measurement with 50 beads each; The average velocity with the "air condition" switched on is slightly higher than without it – visible in the left shift of the profile.

Fig. 19